

## ABSTRACT

A turbogenerator system including a recuperator and a catalytic combustor employs a preheater located between the turbine outlet and the recuperator low-pressure inlet to heat the low-pressure turbine exhaust. Heat from the turbine exhaust is transferred to a cool high-pressure flow in the recuperator. A recirculation loop employs valves downstream of the recuperator low-pressure outlet to divert the recuperator low-pressure exhaust into the compressor to be recirculated through the recuperator high-pressure side and the catalytic combustor. Reduced start-up times and emissions are achieved by raising the combustor catalyst to its light-off temperature in a shorter period of time.